

FLOOD PLAINS OF THE SOUTH BRANCH SHIAWASSEE RIVER, LIVINGSTON COUNTY, MICHIGAN

by
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INTRODUCTION

This report presents the results of a flood-plain study of approximately 1.9 mi (3.1 km) of the South Branch Shiawassee River in Livingston County. This reach of stream is in a currently unincorporated area about 40 mi (64 km) northwest of Detroit. Although little development has taken place, the potential for development is great due to urban spread from the Detroit Metropolitan area. To implement local flood-plain management plans, areas subject to flooding must be defined. This report is intended to provide that information. The report has been prepared in cooperation with the Livingston County Planning Commission and the Michigan Department of Natural Resources.

The reach of river mapped extends from the south boundary of section 3, T.2 N., R.4 E., to the west bound lane of Interstate Highway 96. Six maps at a scale of 1:2400 (1 in = 200 ft or 1 cm = 24 m) were prepared; the areas covered by each map are shown on figure 1. The flood-plain maps show the area that would be inundated by a flood that has an average recurrence interval of once in 100 years; for brevity such a flood is termed the "100-year flood".

EXPLANATION OF TERMS

DISCHARGE.--The volume of water that passes a particular location on a stream in a given period of time.

FLOOD PLAIN.--The lowland that borders a river, usually dry but subject to flooding.

LOG-PEARSON TYPE III DISTRIBUTION.--A statistical method of determining the probability of occurrence of stream discharges of a given magnitude.

RECURRENCE INTERVAL.--The average interval of time within which a given flood will be equaled or exceeded once. "Probability" is the inverse of recurrence interval. Thus, a flood having a 20-year recurrence interval has a 5-percent chance of being equaled or exceeded in any year.

ROUGHNESS COEFFICIENT.--A dimensionless number expressing the resistance of a stream channel and adjacent flood plain to the flow of water.

CONVERSION FACTORS

The following factors may be used to convert English units to metric units.

Multiply English units	By	To obtain metric units
feet (ft)	0.3048	metres (m)
miles (mi)	1.609	kilometres (km)
cubic feet per second (ft ³ /s)	.02832	cubic metres per second (m ³ /s)

REFERENCE MARKS

In order to use aerial photography for determining the elevation of the land surface in the study area, a field survey was made to establish ground control points of known elevation. During the course of the survey, two reference marks were established. Elevations and locations of the marks are as follows:

Elevation above mean sea level, in feet (Datum of 1929)	Location
902.02	Red plastic stake at base of pole #2785B2 at north side of intersection of State Highway 155 and Norton Road.
936.23	Red plastic stake at base of utility pole on west side of State Highway 155 approximately 75 ft north of intersection with Jewell Road.

DESCRIPTION OF THE AREA

The land surface of the South Branch Shiawassee River study area is relatively flat. Extensive areas of swamp and marsh lands occur throughout the area. These wetlands are separated by low hills or a moderately undulating land surface. Several lakes occur in the headwaters area. The lakes and wetlands are important as storage basins for runoff of rainfall or snowmelt, and effectively reduce peak flood discharges. Geologically, surface deposits in the area drained by the South Branch are principally glacial moraines.

The flood plain of the South Branch is broad and is generally swampy in character or has a dense growth of brush. Much of the stream channel has been dredged and, in the study area, its alignment has been straightened to improve its water carrying capacity.

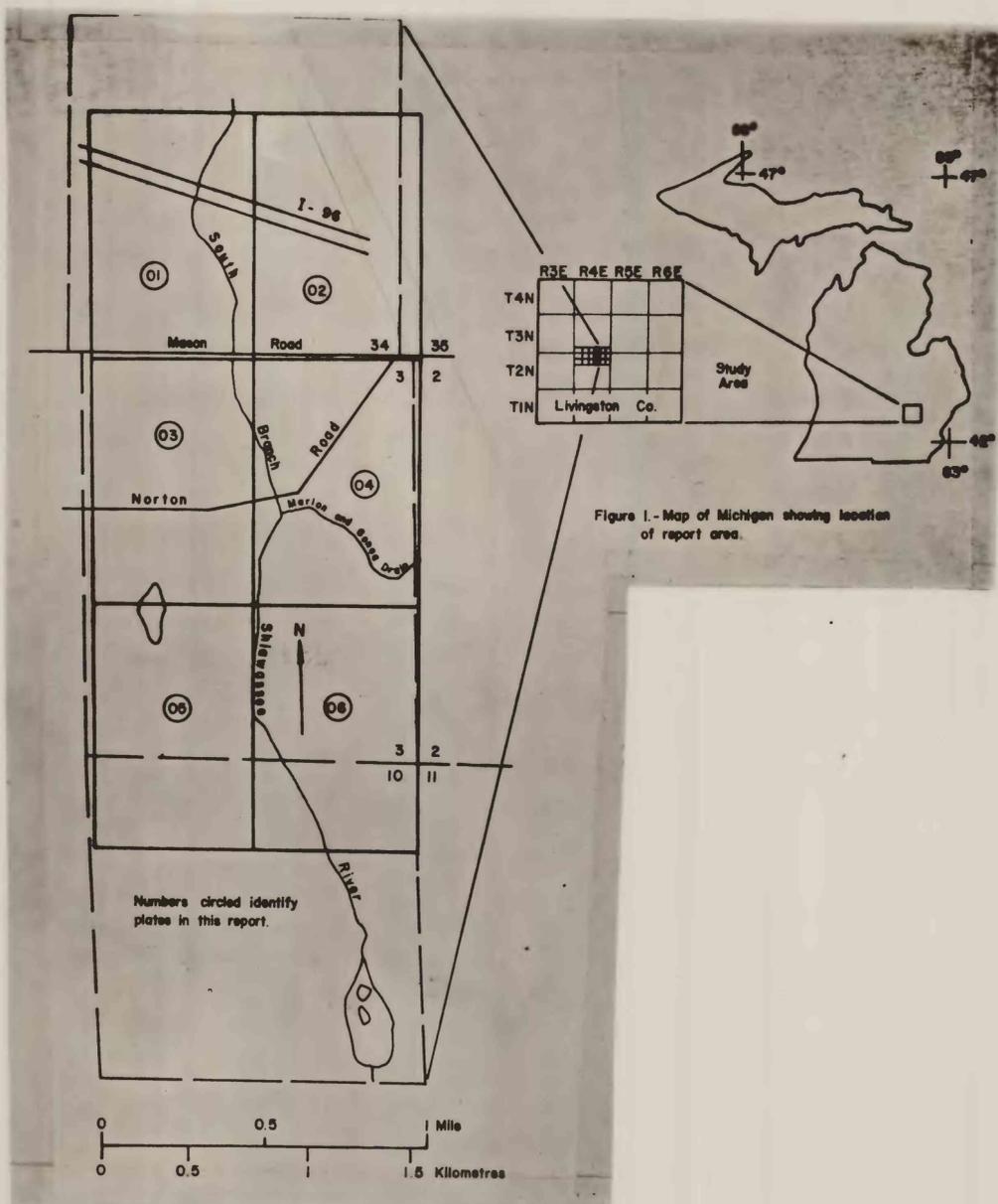


Figure 1.-Map of Michigan showing location of report area.

FLOOD FREQUENCY ANALYSES

Streamflow records have not been collected on the South Branch Shiawassee River, and prior to 1973, no information on flood magnitudes had been obtained. In 1973, three high-flow discharge measurements were made on the South Branch Shiawassee River at Norton Road. Three measurements were also made on Marion and Genoa Drain, a major tributary to the South Branch Shiawassee River in the study area. These measurements were made at Peavy Road, about 1 mi (1.5 km) upstream from the mouth of the drain. In addition, crest-stage gages were installed at the two sites to record the maximum stages on these streams.

Several methods were used to define the discharge-frequency relationships for the South Branch. Regional studies by S. W. Wiitala (1965), P. C. Bent (1970, 1971), and methods developed by C. H. Hardison (1973) were the primary basis for defining the peak flows characteristics. In addition, discharge data collected in 1973 were used to define streamflow patterns by correlating them with concurrent discharge data collected at nearby gaging stations. Results of these analyses were coordinated with the Hydrological Survey Division of the Bureau of Water Management, Michigan Department of Natural Resources. Results of the analyses are shown graphically in figure 2.

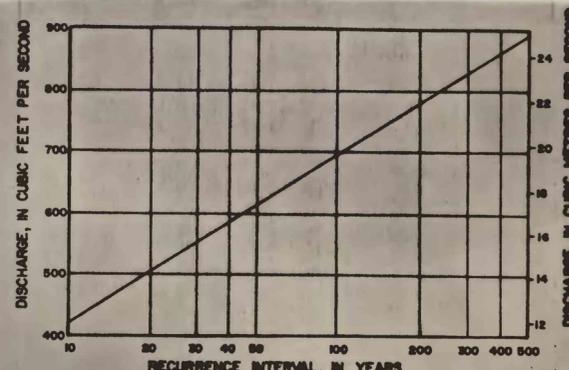


Figure 2.-Frequency of flood discharges on South Branch Shiawassee River at Norton Road